

2.1 - Use Inductive Reasoning

Describe how to sketch the fourth figure in the pattern. Then sketch the fourth figure.

Figure 1

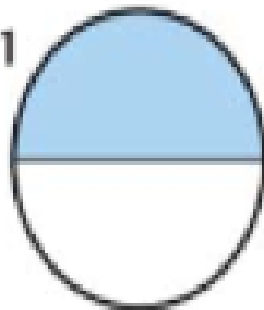


Figure 2

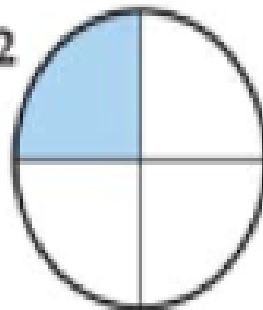
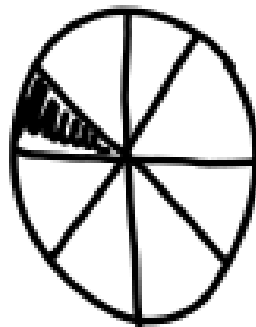
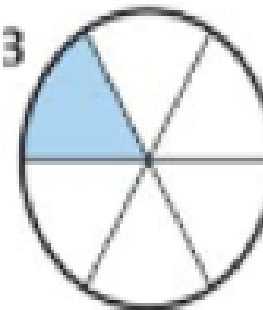


Figure 3








Describe the pattern in the numbers -8, -32, -128, -512, ...
and write the next three numbers in the pattern

$$\begin{array}{ccccccc} & \times 4 & & \times 4 & & & \\ & \curvearrowright & & \curvearrowright & & & \\ -8, & -32, & -128, & -512, & & & \\ & -2,048, & -8,192, & & & & \\ & & -32,768 & & & & \end{array}$$

Conjecture: unproven statement that is based on observations

Inductive Reasoning: when you find a pattern in specific cases and then write a conjecture for the general case

Ex 3: Given five collinear points, make a conjecture about the number of ways to connect different pairs of the points.

# of points	1	2	3	4	5
picture					
# of connections	0	+1 → 1	+2 → 3	+3 → 6	+4 → 10

Ex 4: Numbers such as 3, 4, and 5 are called *consecutive integers*. Make a conjecture for the sum of any three consecutive integers.

$$\begin{array}{l} 4 \times 3 \\ 3 + \textcircled{4} + 5 = 12 \\ 4 + \textcircled{5} + 6 = 15 \\ 5 \times 3 \\ 6 + \textcircled{7} + 8 = 21 \\ 7 \times 3 \end{array}$$

Multiply the
2nd number
by 3 to find
the sum
of consecutive integers.

Consider the following conjectures:

If $x = 3$, then $x^2 = 9$

If $x^2 = 9$, then $x = 3$ $(-3)^2 = 9$, $x \neq 3$

Are they both true? Why or why not?

$x = -3$ doesn't work

Counter-Example: specific case for which the conjecture is false.

Homework: p.75 #2-30 even